

WHAT IS CLAIMED IS:

1. A method of specifically suppressing an undesired immune response in a mammal suffering from such a response, which method comprises:

i) preparing a construct comprising at least one discrete antigenically recognizable moiety corresponding to an antigenic determinant of an antigen causing the undesired immune response bound to a pharmacologically acceptable carrier

wherein the number of said moieties bound to said carrier and the spacing of said moieties on said carrier are such that said construct does not elicit an immune response to said moieties but does directly compete with said antigen for receptors on an immunocompetent cell that recognizes said determinant, and thereby said construct specifically suppresses said undesired immune response; and

ii) administering said construct to said mammal in an amount such that suppression of said undesired immune response is effected.

2. A method of specifically suppressing an undesired immune response in a mammal suffering such a response, which method comprises:

i) preparing a construct comprising at least one discrete antigenically recognizable moiety corresponding to an antigenic determinant of an antigen causing the undesired response bound to a pharmacologically acceptable carrier

wherein the number of said moieties bound to said carrier is less than the number necessary to form, when bound to receptors for said moieties on an immunocompetent cell that recognizes said determinant, an aggregate of said receptors

sufficient to stimulate antibody formation, said construct competitively inhibiting the formation of antigen-receptor aggregates on said immunocompetent cell and thereby specifically suppressing said undesired response, and

ii) administering said construct to said mammal in an amount such that suppression of said undesired immune response is effected.

3. A method of specifically suppressing an undesired immune response in a mammal suffering such an undesired immune response, which method comprises:

i) preparing a construct comprising at least one discrete antigenically recognizable moiety corresponding to an antigenic determinant of an antigen causing the undesired response bound to a pharmacologically acceptable carrier

wherein the construct is smaller than the minimum size necessary to form, when said moieties of said construct are bound to receptors for said moieties on an immunocompetent cell that recognizes said determinant, an aggregate of said receptors sufficient to stimulate antibody production, said construct competitively inhibiting the formation of antigen-receptor aggregates on said immunocompetent cell and thereby specifically suppressing said undesired immune response, and

ii) administering said construct to said mammal in an amount such that suppression of said undesired immune response is effected.

4. The method according to claim 1 wherein the antigen is an extrinsic antigen that causes an allergic reaction.

5. The method according to claim 1 wherein said antigen is an intrinsic antigen that causes an autoimmune disease.

6. The method according to claim 1 wherein said antigen is a foreign protein or tissue.

7. The method according to claim 1 wherein said construct is non-immunogenic.

8. The method according to claim 1 wherein said antigen is a T-cell dependent antigen.

9. The method according to claim 1 wherein said immunocompetent cell is a B-cell.

10. The method according to claim 1 wherein said immunocompetent cell is a T-cell.

11. The method according to claim 1 wherein said construct is administered in a form substantially free of material that stimulates an immune response to said antigen.

12. The method according to claim 1 wherein the number of said moieties bound to said carrier is between 1 and 20.

13. The method according to claim 1 wherein said construct has a molecular weight less than about 150,000 daltons.

14. A method of preparing a construct that, when administered to a mammal, suppresses an

undesired immune response to an antigen,
comprising:

(i) binding to a pharmacologically acceptable carrier molecule at least one discrete antigenically recognizable moiety corresponding to an antigenic determinant of said antigen, whereby said construct is formed,

wherein the number of said moieties bound to said carrier and the spacing of said moieties on said carrier are such that said construct does not elicit an immune response to said moieties but does directly compete with said antigen for receptors on an immunocompetent cell that recognizes said determinant; and

ii) purifying said construct away from immune stimulatory molecules present following binding step (i).

15. A method of preparing a construct that, when administered to a mammal, suppresses an undesired immune response to an antigen, comprising:

(i) binding to a pharmacologically acceptable carrier molecule at least one discrete antigenically recognizable moiety corresponding to an antigenic determinant of said antigen, whereby said construct is formed,

wherein the number of said moieties bound to said carrier molecule is less than the number necessary to form, when bound to receptors for said moieties on an immunocompetent cell that recognizes said determinant, an aggregate of said receptors sufficient to stimulate antibody production; and

(ii) purifying said construct away from immune stimulatory molecules present following binding step (i).

16. A method of preparing a construct that, when administered to a mammal, suppresses an undesired immune response to an antigen, comprising:

(i) binding to a pharmacologically acceptable carrier molecule at least one discrete, antigenically recognizable moiety corresponding to an antigenic determinant of said antigen, whereby said construct is formed,

wherein said construct is smaller than the minimum size necessary to form, when said moieties of said construct are bound to receptors for said moieties on an immunocompetent cell that recognizes said determinant, an aggregate of said receptors sufficient to stimulate antibody production; and

(ii) purifying said construct away from immune stimulatory molecules present following binding step (i).

17. The method according to claim 14 wherein said moieties are covalently bound to said carrier molecule.

18. The method according to claim 14, wherein said carrier molecule is a polysaccharide polymer, polyacrylamide, a polyvinyl alcohol or a polypeptide.

19. The method according to claim 14 wherein said moiety is a peptide or protein, a carbohydrate, a nucleic acid, or a lipid.

20. The method according to claim 14 wherein said moiety, prior to said binding step (i), is derivatized with a protected thiol-

containing group through which binding to said carrier molecule is effected.

21. The method according to claim 20 wherein said binding of said thiol-containing group to said carrier molecule is effected via the formation of a covalent bond which is not susceptible to acid hydrolysis or reduction.

22. The method according to claim 21 wherein said thiol-containing group is formed by reacting N-acetyl-S-Npys-L-cysteine-N-hydroxysuccinimide ester or N-(succinyl-N-hydroxysuccinimide ester)-S-Npys-cysteamine with a primary amine within said antigenic moiety.

23. The method according to claim 22 further comprising, after said binding step (i), subjecting an aliquot of said construct to acid hydrolysis and measuring the amount of the S-succinylated moiety present in said hydrolysate.

24. The method according to claim 14 wherein said moiety is a peptide or protein and wherein said moiety is bound to said carrier molecule via a sulfhydryl group of an amino acid residue.

25. The method according to claim 24 wherein said residue is a cysteine, homocysteine or cysteamine residue.

26. The method according to claim 14 wherein said moiety is bound to said carrier molecule via a spacer molecule.

27. The method according to claim 14 wherein said carrier molecule and said construct are soluble in a physiologically acceptable buffer.

28. The method according to claim 14 wherein said carrier molecule is modified prior to said binding step (i) so as to introduce a functional group that binds with said moiety.

29. The method according to claim 28 wherein said functional group is a primary amine.

30. The method according to claim 14 wherein said moiety includes a saccharide portion and wherein, prior to said binding step (i), said saccharide portion is reacted with a diamine under conditions such that a terminal primary amino group is formed thereon through which said binding is effected.

31. The method according to claim 14 wherein said moiety includes a saccharide portion and wherein, prior to said binding step (i), said saccharide portion is reacted with cysteamine, or salt thereof, under conditions such that a free terminal sulfhydryl group is formed thereon through which said binding is effected.

32. The method according to claim 14 wherein said carrier molecule is dextran and wherein, prior to said binding step (i), said carrier molecule is converted to dexamine.

33. The method according to claim 32 wherein said dexamine is, prior to said binding

step (i), converted to gamma-maleimido-n-butyryl dexamine.

34. A preparation of constructs size fractionated to homogeneity, each construct of said homogeneous preparation comprising at least one discrete antigenically recognizable moiety corresponding to an antigenic determinant of an antigen that causes an undesired immune response bound to a pharmacologically acceptable carrier molecule

wherein the number of said moieties bound to said carrier molecule and the spacing of said moieties on said carrier molecule are such that said construct does not elicit an immune response to said moieties but does directly compete with said antigen for receptors on an immunocompetent cell that recognizes said determinant.

35. The construct preparation according to claim 34 wherein said moiety is bound to said carrier molecule via a spacer molecule.

36. The construct preparation according to claim 34 wherein said spacer molecule is an omega amino carboxylic acid.

37. The construct according to claim 34 wherein said carrier molecule is a protein.

38. The construct according to claim 34 wherein said construct comprises protein oligomers.

39. The construct according to claim 38 wherein said construct is a recombinantly produced fusion protein.

40. The construct preparation according to claim 34 wherein said construct comprises a biotinylated protein tetravalently arrayed on strepavidin.

41. The construct preparation according to claim 34 wherein said moiety is bound to said carrier molecule via a succinylated sulfur-containing amino acid or amino acid derivative.

42. The construct preparation according to claim 41 wherein said amino acid or amino acid derivative is cysteine, cysteamine or homocysteine.

43. The construct preparation according to claim 34 wherein said carrier molecule comprises a cyclodextrin or modified cyclodextrin.